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CIRCULAR SAW
[MARUNOKO]

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Specification

1. Title of the Invention

Circular Saw

2. Claims

(1) A circular saw comprising:

a base to be placed on an upper surface of a material to be cut;

a handle provided upright from the base; and

a main body case, which has a sawtooth and a motor to drive the sawtooth and is freely rotatably joined to the base and the handle; and

a securing means that is provided between the main body case and the handle or between the main body case and the base to secure the main body case to the base at optionally set angle from the base.

(2) The circular saw according to Claim 1, wherein the handle has a slide guiding surface for rotation of the main body case.

(3) The circular saw according to Claim 1, wherein the securing means is provided being upright from the base and comprises an adjustment plate having a number of engagement recesses in a row or in rows and a pin that is provided on the main body case and has protrusions that

engage with some of the engagement recesses by spring energization.

3. Detailed Description of the Invention

[Field of the Invention]

The present invention relates to a circular saw, and especially relates to a portable electronic circular saw.

[Background Technology]

The cutting depth of a circular saw is adjusted by freely rotatably joining a main body case that holds a sawtooth and a motor to drive the sawtooth in relative to a base to be placed on an upper surface of a material to be cut and changing the joining angle. Fig. 1 shows an example of a conventional circular saw. In the figure, [1] is a base; and [2] is a main body case. The main body case [2] is freely rotatably joined to the upper face of the front edge of the base [1] with a shaft [6]. In addition, a stationary cover [7], which is attached to the main body case [2] and covers a sawtooth [4], is joined to at arbitrary position of an adjustment plate [10], which is provided protruding from an upper face of the rear edge of the base [1], with an adjustment screw [20]. With this configuration, the joining angle between the base [1] and the main body case [2] can be adjusted and secured, and thereby the cutting depth of the sawtooth [4] can be

adjusted. In the figure, [19] is a flange to attach the sawtooth [4]; [9] is a material to be cut; and [8] is a rotation guard that covers the sawtooth [4] under the base [1].

/2

In case of a conventional circular saw, since the handle [3] of the circular saw is integrally formed with the main body case [2], there are the following problems. In case of a circular saw of this type, the handle [3] is provided to have a certain angle α from the base [1]. If force F that is in a parallel direction to the base [1] is applied onto a load point K of the handle [3] upon cutting the material, a force component $F_{\sin \alpha}$ of the force F becomes vertical force that pushes the base [1] to the material [9] to be cut. However, since the handle [3] is integrally formed with the main body case [2], when the cutting depth is set to be shallow, not only the position of the load point K changes, but the force component $F_{\sin \alpha}$, i.e. vertical load, also becomes smaller. Accordingly, the force to push the circular saw to the material [9] to cut, i.e. force to hold the circular saw, becomes weaker, and therefore the circular saw tends to be easily damaged. Especially when the cutting depth is set to be shallow, since the position of center of gravity G becomes higher

and moment around the center of gravity G generated by the cutting resistance P becomes larger, the circular saw becomes even more unstable and more difficult to handle.

[Purpose of the Invention]

In view of the above problems, there is provided an invention, an object of which is to provide a circular saw, in which the handle can stay in a constant position in relative to the base and the load point and the vertical force component do not change even when the cutting depth is change. Accordingly, a circular saw that can be easily handled and can perform stable cutting work can be provided.

[Disclosure of the Invention]

In the invention, a handle is provided being upright from a base that is to be placed on an upper surface of a material to be cut, a main body case having a sawtooth and a motor to drive the sawtooth is freely rotatably joined to the base and the handle. Upon adjustment of the cutting depth, the handle does not move with the main body case, and the base and the handle are kept at the same angle. In this case, if the handle has a slide guide for the rotation of the main body case, the joining strength between the handle and the case can be increased, and thereby the cutting work can be easier and the cutting depth can be stably adjusted. A means to secure the main body case and

the base at a certain joining angle may not be fastening of an adjustment screw as described in the conventional circular saw, but may be preferably a configuration which includes an adjustment plate that is provided upright from the base and has a number of engagement recesses; and a pin that has protrusions that engage with some of the engagement recesses by spring energization, in view of the operability and secure fixation.

The invention will be further described below with embodiments shown in Figs. 2-8. In the figures, [1] is a base; [2] is a main body case; and [3] is a handle. The base [1] has a support plate that protrudes from an upper face of the front edge and the main body case [2] can freely rotate with a shaft [6] that is inserted in the support plate. In addition, a handle [3] having a generally half circular shape is provided being upright from the rear edge of the base [1]. [21] is a switch. The main body case [2] holds a motor [5] one side of the inside, and has a stationary cover [7] that is integrally formed to cover a sawtooth [4] on the other side. On an output shaft of the motor [6], a pinion [22] is secured. On a driving shaft [23] that is held in a gear box [25], a reduction gear [24] is secured, the sawtooth [4] is attached with an

attachment flange, and a rotation guard [8] and spring [26] for moving back of the rotation guard are attached.

A groove [27] is formed on a surface of the main body case [2] on the handle side so as to fit therein a brim [9] that has circular surface around the shaft [6] and protrudes from the handle [3]. With this configuration, the handle [3] can slide to be guided upon rotation of the main body case [2] around the shaft [6]. Furthermore, an adjustment plate [10], a pin [11], and a spring [15] are used as means of securing the main body case [2] to the base or the handle [3]. The adjustment plate [10] is formed being upright from the one side at the rear end of the base [1] and has a circular shape around the shaft [6], and has a vertically long groove [12] and a number of engagement recesses [13] that connect to the long groove as shown in Fig. 7. The pin [11] is provided on the rear part of the stationary cover [7] to the main body case [2], has on its end protrusions [14] and [14] that protrude in both sides, and is spring-energized backward by a spring [15]. The rear part of the stationary cover [7], which has a circular shape around the shaft [6] similarly to the adjustment plate [10], covers the adjustment plate [10], and by engagement of the protrusions [14] of the pin [11]

into any of the engagement recesses [13], the main body case [2] can be secured to the base [1] at any angle.

/3

Upon adjustment of the cutting depth, pushing the pin [11] against the spring energization and the protrusions [14] are removed from the engagement recesses [13] as shown in Fig. 6. Then, in this state, the main body case [2] is rotated around the shaft [6] in relative to the base [1] and the handle [3]. If the pin [11] is put back at a desired position, the protrusions [14] engage with the engagement recesses again and then secured. The corners of the protrusions [14] and edges of the engagement recesses [13] are preferably chamfered as shown in Fig. 8 or finished to have a curved surface.

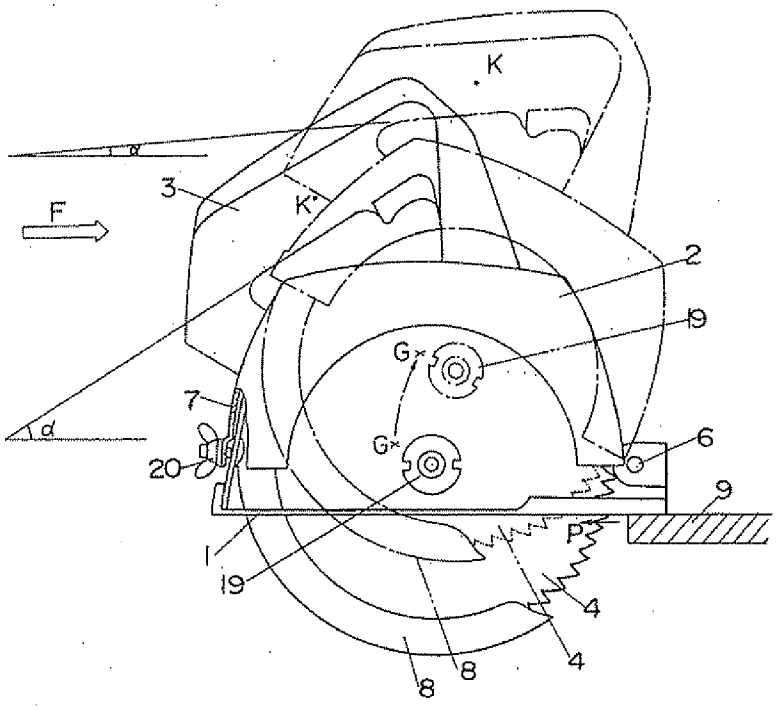
Even when the cutting depth is adjusted in this way, as shown in Fig. 4, the position of the handle [3] is constant in relative to the base [1], and the angle α between the base [1] and the handle is constant. Although there is slight displacement of the center of gravity, it is always possible to use the circular saw of the invention with same operating feeling regardless of the setting of the cutting depth, and it is possible to achieve stable cutting work.

[Effects of the Invention]

As described above, according to a circular saw of the invention, the operability and stability is not impaired by adjustment of the cutting depth and it is possible to achieve stable cutting with good operability regardless of the setting of the cutting depth.

4. Brief Description of the Drawings

Fig. 1 is a front view of a conventional example; Fig. 2 is a partial cutaway front view of an embodiment of the invention; Fig. 3 is a sectional view taken along line X-X of Fig. 2; Fig. 4 is a front view of the embodiment; Figs. 5 and 6 are sectional views of a securing means in the embodiment; Fig. 7 is a front view of an adjustment plate; and Fig. 8 is a sectional view taken along line Y-Y of Fig. 7. In the figures, [1] is a base; [2] is a main body case; [3] is a handle; [4] is a sawtooth; [5] is a motor; [9] is a brim as a slide guiding surface; [10] is an adjustment plate; [11] is a pin; [13] is an engaging recess; and [14] is a protrusion.


K
α
3
K'
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2
9
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20
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P
1
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8
8
4

[Fig. 1]

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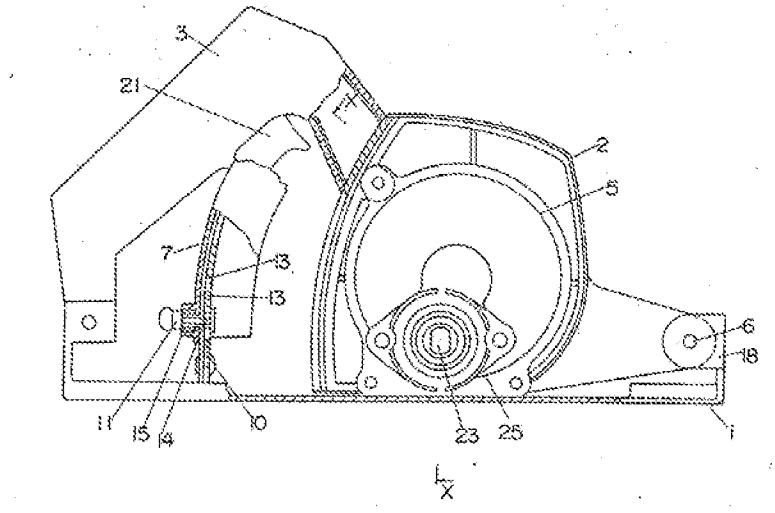
3
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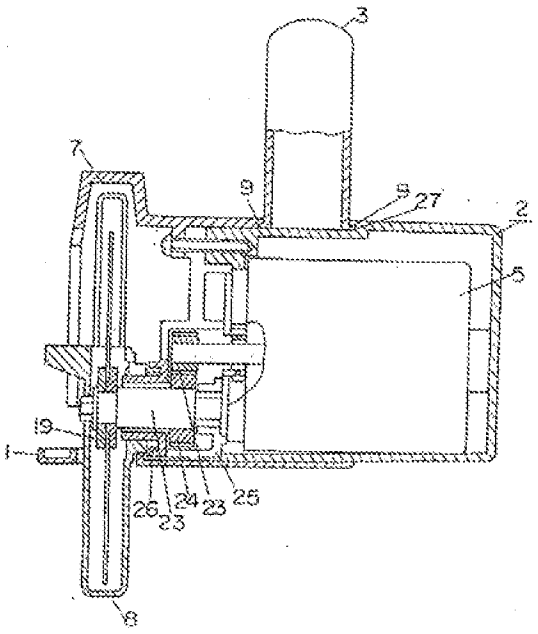
X

[Fig. 2]



[Fig. 3]

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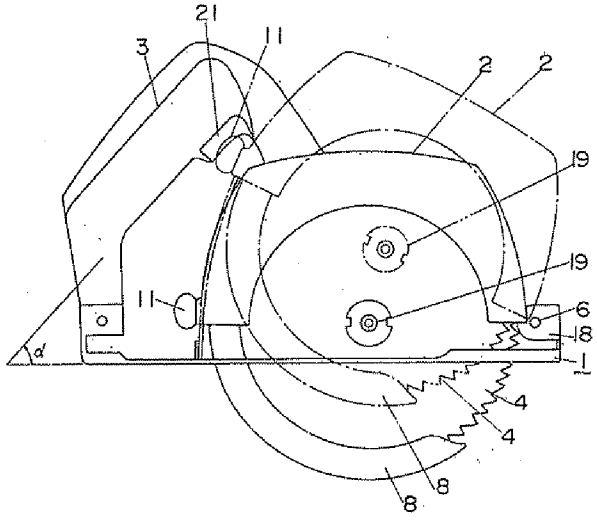
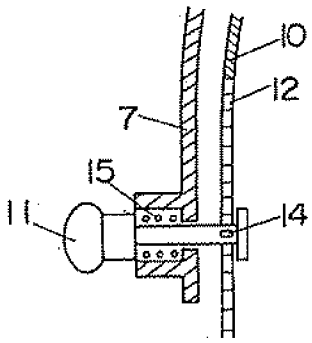
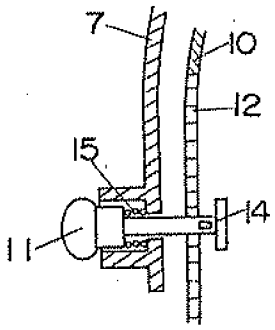


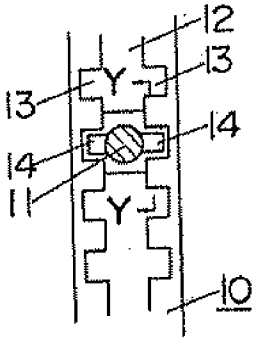
[Fig. 4]



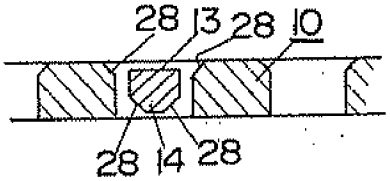
[Fig. 5]



[Fig. 6]



[Fig. 7]



[Fig. 8]